Utah Department of Health & Human Services

Invasive group B strep – *Streptococcus agalactiae*

Disease plan

Quick links

Last updated: November 29, 2023 by Jared Ripplinger

Questions about this disease plan?

Contact the Utah Department of Health and Human Services, Office of Communicable Diseases: 801-538-6191.

Invasive group B strep critical clinician information

Clinical evidence

Signs/symptoms

Invasive group B *Streptococcus* (also known as group B strep or GBS) presents in different ways depending on the patient and infection type:

- Pregnant people
  - Urinary tract infection (cystitis, pyelonephritis)—pain or burning while urinating, frequent urination, low fever, cloudy or bloody urine, and/or pressure or cramping of the groin/abdomen.
  - Asymptomatic bacteriuria
  - Intra-amniotic infection—maternal fever and tachycardia, fetal tachycardia, uterine tenderness, and purulent or malodorous amniotic fluid.
  - Endometritis—pelvic pain
  - Bacteremia – fever, chills, disorientation, hypotension, respiratory failure and sepsis.
- Neonates—early onset, less than 7 days old
  - Sepsis—fever, shivering, pain, discomfort, clammy or sweaty skin, shortness of breath, and tachycardia.
  - Pneumonia—fever, chills, difficulty breathing, and chest pain; and/or meningitis—fever, headache, stiff neck, nausea, vomiting, photophobia and altered mental status
- Young infants—late onset (7-89 days old)
  - Bacteremia—fever, chills, disorientation, hypotension, respiratory failure and sepsis.
  - Meningitis—fever, headache, stiff neck, nausea, vomiting, photophobia and altered mental status.
- Non-pregnant adults
  - Skin and soft tissue infections—redness, swelling, warmth, pain and tenderness.
  - Bacteremia—fever, chills, disorientation, hypotension, respiratory failure and sepsis.
  - Urinary tract infection—pain or burning while urinating, frequent urination, low fever, cloudy or bloody urine, and/or pressure or cramping of the groin/abdomen.
  - Pneumonia—fever, chills, difficulty breathing, and chest pain.
  - Meningitis—fever, headache, stiff neck, nausea, vomiting, photophobia and altered mental status.
  - Toxic shock-like syndrome—fever, rash, hypotension and electrolyte imbalance.
  - Osteomyelitis

Period of communicability

- The period of communicability for GBS is unknown, but it presumably lasts for the duration of colonization.

Incubation period

- Early onset (neonates)—less than 7 days, usually presenting within 24 hours
- Late onset (neonates) and adults—variable

Mode of transmission

- Infants—infection from mother occurs shortly before or during birth, occasionally person-to-person transmission in nursery

- Risk factors include maternal colonization at any point during pregnancy and previous GBS positive pregnancies.
- Adults—infection from person-to-person transmission or autoinoculation

Laboratory testing

Type of lab test/timing of specimen collection

- Generally performed at commercial labs
- Culture, serologic, or molecular testing

Confirmatory lab evidence

- Specimen must be isolated from normally sterile sites, including:
  - Blood,
  - cerebrospinal fluid (CSF),
  - pleural fluid,
  - peritoneal fluid,
  - pericardial fluid,
  - bone,
  - joint/synovial fluid, or
  - internal body sites (e.g., lymph node, brain)
- OR pathogen-specific nucleic acid must be detected in a specimen obtained from a normally sterile body site, using a validated molecular test

Treatment recommendations

Type of treatment

- Penicillin G is effective antibiotic treatment for adults and young infants, dosage dependent on weight and age
- For patients with penicillin allergies, other specific or broad range antibiotics can be administered in place of Penicillin G
- Empiric therapy for early onset in neonates includes ampicillin and gentamicin
- Empiric therapy for early onset in neonates varies by site of infection

Time period to treat

- Adults and infants—as soon as possible

Prophylaxis

- Recommended for GBS-positive pregnant people at least 4 hours prior to delivery—see current recommendations on pages 4-5.

Contact management

Isolation of case

- None

Quarantine of contacts

- None

Infection control procedures

- Standard Precautions should be followed for neonatal GBS disease. Infection control for other situations is not currently defined.

Why is invasive group B *Streptococcus* important to public health?

Group B *Streptococcus* is a type of bacteria, *Streptococcus agalactiae*, that commonly reside in people's gastrointestinal and genital tracts, and are usually not harmful. Sometimes these bacteria invade parts of the body that are normally-sterile and can cause certain infections, which are collectively known as invasive group B strep (GBS) disease, and is of special concern in newborns. GBS disease in newborns most commonly causes bacteremia (infection of the blood), sepsis (the body's extreme response to infection), pneumonia (infection of the lungs), and meningitis (infection of the fluid and lining around the brain). In the United States, group B strep bacteria are the leading cause of meningitis and bacteremia in a newborn's first 3 months of life, and 2 to 3 in every 50 babies (4-6%) who develop GBS disease die.[1] The most common problems caused by group B strep in adults are bacteremia, pneumonia, skin and soft-tissue infections, and bone and joint infections. The rate of serious GBS disease in adults increases with age, and about 1 in 20 non-pregnant adults with serious GBS infections dies.[1]

Disease and epidemiology

Clinical description

GBS is a major cause of perinatal bacterial infections in both pregnant people and infants. In addition, adults with diabetes, heart disease, congestive heart failure, cancer or a history of cancer, and obesity are more susceptible to invasive GBS infections.

In pregnant people, GBS can cause urinary tract infections, womb infections (endometritis and chorioamnionitis), bacteremia, and stillbirth.

In newborns, infection is characterized by two definitions:

Early onset disease (<7 days old)
Early onset disease occurs in newborns less than 7 days old, and most frequently within the first 24 hours after delivery. Early-onset GBS can manifest as bacteremia, sepsis, pneumonia, and meningitis.

Late onset disease (7-89 days old)
Late onset disease occurs between 7 and 89 days after delivery and can manifest as bacteremia, sepsis, pneumonia, and meningitis just like early onset disease.

Among non-pregnant individuals, the most common presentations of GBS include sepsis, pneumonia, endocarditis, and cellulitis.[2]

Causative agent

GBS disease is caused by the aerobic bacterium *Streptococcus agalactiae.* There are ten serologically distinct serotypes of *S. agalactiae.*[3] Serotype Ia was the most frequently identified serotype in Active Bacterial Core (ABC) states as of 2020.[4]

Differential diagnosis

GBS disease can be similar to disease caused by many other pathogens and syndromes. The differential diagnoses vary greatly depending on the patient's age and symptoms.

Laboratory identification

Diagnostic testing: The usual method of identification is through blood or CSF culture for neonates. For pregnant people, a culture or nucleic acid amplification test (NAAT) of a vaginal/rectal swab should be performed, although this is typically used as a screening tool and not as a diagnostic tool. For non-pregnant adults, culture of normally-sterile sites is essential for case identification. Group B strep cultures and NAAT tests are available in most clinical laboratories.

Utah Public Health Laboratory (UPHL): UPHL will provide confirmation for isolates submitted via clinical laboratories.

Prenatal screening: Labs should use a sensitive method for prenatal screening in order to assure that colonized pregnant people receive proper care during delivery. Clinicians should swab both the lower vagina and rectum, and place swabs into non-nutrient transport medium, from 36 through 37 weeks of gestation.[5,6] Labs should inoculate the swabs into a selective enrichment broth for overnight incubation, and then subculture the broth onto sheep blood agar.[5] Alternatively, swabs can be placed in enrichment broth for overnight incubation followed by NAAT testing.[5]

UPHL: UPHL does not provide prenatal screening services.

Early-onset GBS disease prophylaxis

- All pregnant people should be screened for GBS carriage 36 through 37 weeks of gestation,[6] unless intrapartum GBS prophylaxis is already indicated due to GBS bacteriuria or a history of a previous GBS-infected newborn.[6]

- The preferred antibiotic for intrapartum prophylaxis is penicillin G, and ampicillin is an acceptable alternative.[6]
- Pregnant people who are allergic to penicillin generally receive clindamycin, but only if susceptibility testing confirms the organism is susceptible.[6]
- Vancomycin is recommended only as an option for pregnant people who are severely allergic to penicillin and are carrying clindamycin-resistant GBS, as confirmed by susceptibility testing.[6]
- Colonized individuals should NOT be treated with oral antimicrobial agents as they are not effective in eliminating GBS carriage or preventing invasive disease.[6]
- Pregnant people with GBS bacteriuria SHOULD be treated prior to delivery because bacteriuria only occurs in context of a high bacterial load.[6]

The most recent guidelines (2020) from American Society for Microbiology (ASM) and the American College of Obstetricians and Gynecologists (ACOG) for intrapartum screening and antimicrobial prophylaxis are available on the ASM website (https://asm.org/Guideline/Guidelines-for-the-Detection-and-Identification-of http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5910a1.htm) and American College of Obstetricians and Gynecologists website (https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2020/02/prevention-of-group-b-streptococcal-early-onset-disease-in-newborns).

Case fatality

Nationally, 2 to 3 in every 50 babies (4-6%) who develop GBS disease die[1] and about 1 in 20 non-pregnant adults (5%) with serious GBS infection die.[1] 31 deaths in Utah across all age groups were attributed to GBS from 2012-2022, for a case fatality rate of 1.4%.[7]

Reservoir

Humans and cattle are the main reservoirs for *S. agalactiae*. The organism has also been isolated from dogs, cats, rabbits, horses, guinea pigs, goats, fish, and aquatic mammals.[8]

Susceptibility

Adults with chronic illnesses such as diabetes mellitus, obesity, and cardiovascular disease are at higher risk for GBS disease. Pregnant and postpartum people, the fetus, and the newborn are also at higher risk for GBS disease. For neonates, the risk of disease is higher if they are born to pregnant people with:

- GBS colonization,
- 18 or more hours between rupture of membranes and delivery, or
- preterm delivery.

African American persons in all age groups and adults ages 65 years or older also have higher rates of GBS disease.[9,10]

Transmission

Asymptomatic carriage in the gastrointestinal and/or genital tracts is common. Transmission from gestational parent to infant occurs most often just before or during delivery. Possible nosocomial transmission has been documented between infants in a hospital nursery,[11] but person-to-person transmission is thought to be rare.[12] Spread of GBS is not well understood, especially after early- and late-onset disease. We know that people who live with someone who carries *S. agalactiae* are not at increased risk of getting sick.[12]

Incubation period

The incubation period for early-onset GBS disease is <7 days. The incubation period for late-onset GBS disease in infants is 7-89 days. The incubation period for GBS disease in those 90 days and older is unknown.

Period of communicability

The period of communicability for GBS is unknown, but it presumably lasts for the duration of colonization.

Epidemiology

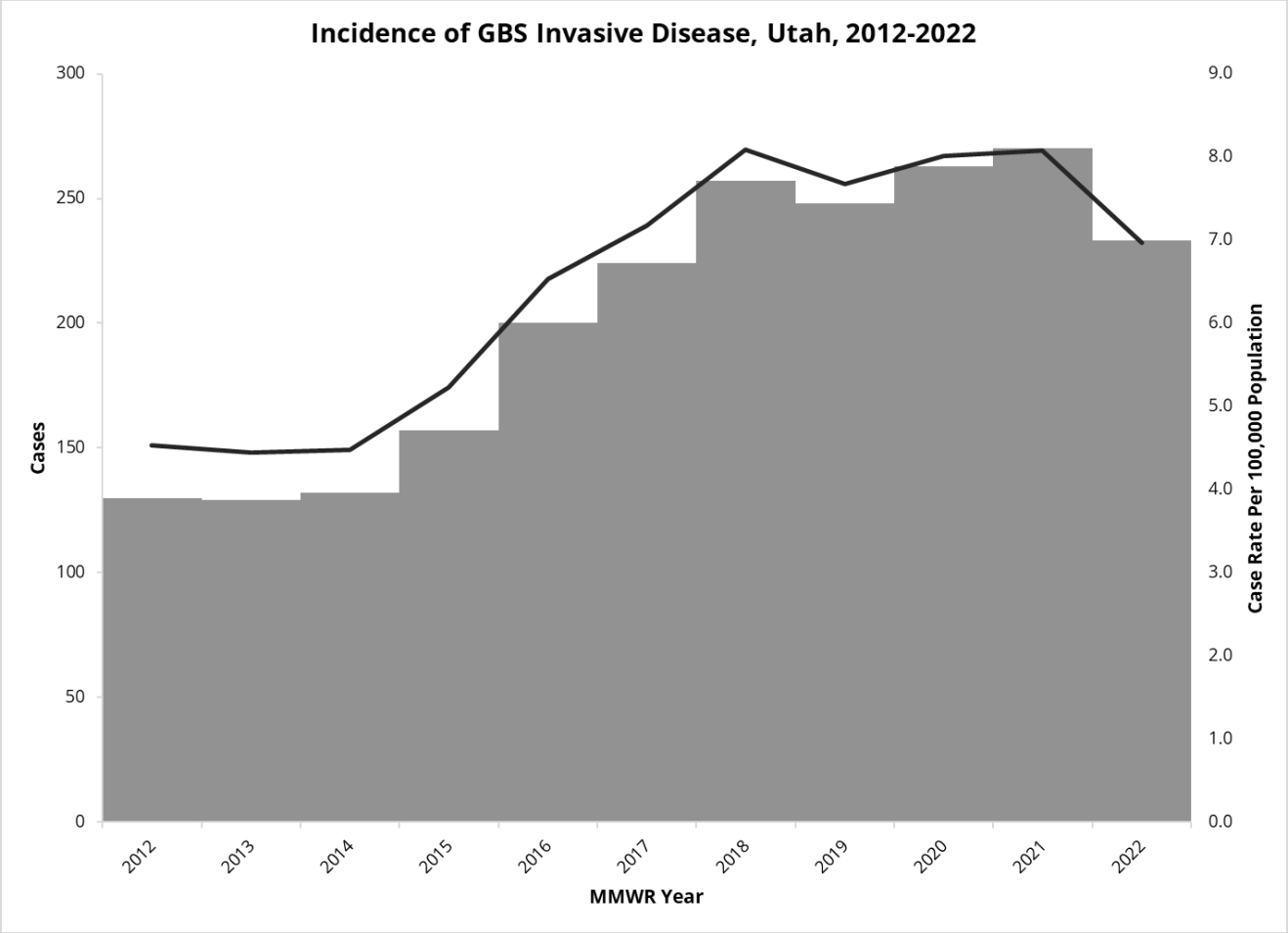
In adults, colonization is common in the genitourinary and gastrointestinal tracts, and occasionally, the pharynx. Approximately 25% of pregnant people carry GBS,[9] and colonization can be constant or intermittent.[13] Pregnant individuals should be screened for colonization from 36 through 37 weeks of pregnancy.[1, 6]

Approximately 28,010 cases of invasive GBS disease occur annually in the United States in all age groups.[10] In newborns, approximately 7,600 cases occurred annually before widespread adoption of prevention guidelines.[10] The rate of early-onset infection decreased from 1.7 cases per 1,000 live births in 1993[10] to 0.2 cases per 1,000 live births in 2020.[10] Racial disparities in disease persist with the incidence higher among African American persons for all age groups.[10]

GBS incidence increased in Utah from 2012-2022, going from 130 cases (4.53 cases per 100,000 population) in 2012[7] to 233 cases (6.97 cases per 100,000 population) in 2022 (see Figure 1).[7] In this period, 15% (341) of cases were younger than 1 year.[7] GBS cases in Utah are distributed non-normally, with highest reported cases in those between 60 and 70 years[7] in addition to high rates in those under 10 years[7] (mostly due to early- and late-onset disease in those under 90 days

old). In this period, 1.6% of reported cases (36 cases) identified as Black or African American alone (not 2 or more races).[7] During the 2020 census 1.5% of Utahns identified as Black or African American alone.[14]

Figure 1: Incidence of GBS invasive disease, Utah, 2012–2022



Public health control measures

Public health responsibility

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education regarding GBS disease transmission, prevention, and treatment to:
  - populations at higher-risk for disease (as defined in *Susceptibility*),
  - clinicians, and
  - first responders.
- Identify clusters or outbreaks.

Prevention and chemoprophylaxis

Current recommendations for the prevention of perinatal GBS disease include:

- Screening all pregnant people from 36 through 37 weeks of gestation by vaginal-rectal swab; culture and/or NAAT when performed after an 18–24-hour incubation step in enrichment broth[6]
- Providing those colonized with GBS with antimicrobial prophylaxis at the time of labor, or of membrane rupture.[6]
- Pregnant people whose culture results are unknown at the time of delivery should be provided antimicrobial prophylaxis if any of the following risk factors are present:
    - Birth at <37 weeks of gestation,
    - Amniotic membrane rupture of 18 hours or more,
    - Gestational parent fever of >38.0 °C (>100.4 °F),
    - Intrapartum NAAT result positive for GBS,
    - Intrapartum NAAT result negative but risk factors develop, and
    - Known GBS positive status in a previous pregnancy.[6]
- The following pregnant people do not need to be screened and should always receive prophylaxis during delivery:
    - Those with GBS bacteriuria during the current pregnancy,[6] or
    - Those who have previously had an infant with invasive GBS disease.[6]
- Pregnant people with a planned cesarean delivery that occurs prior to rupture of membranes should **not** receive intrapartum chemoprophylaxis routinely.[6]
- Routine chemoprophylaxis for neonates born to gestational parents who have received adequate intrapartum chemoprophylaxis for GBS disease is **not** recommended, unless the infant has clinically-suspected systemic infection.[6]

Vaccine

Glycoconjugate GBS vaccines have been tested in preclinical and human phase I and phase II trials, but there are no GBS vaccines currently approved by the FDA or recommended by the ACIP.[13]

Isolation and quarantine requirements

Isolation: None.

Hospital: Standard Precautions should be followed for neonatal GBS disease.[15] Infection control for other situations is not currently defined.[15]

Quarantine: None.

Case investigation

Reporting

Isolation or detection* of group B strep (*S. agalactiae*) is reportable from all normally-sterile sites, including:

- blood,
- CSF,
- pleural fluid,
- peritoneal fluid,
- pericardial fluid,
- bone,
- joint/synovial fluid, or
- internal body sites (e.g., lymph node, brain)

*Molecular tests, such as PCR, are also reportable when they are validated and detect GBS pathogen-specific nucleic acid from a normally-sterile body site.[16]

Case definition

The CDC and Council of State and Territorial Epidemiologists (CSTE) have not established a case definition for GBS. In Utah, the following case definitions apply:

Confirmed
Isolation of *S. agalactiae* (GBS) from any normally sterile body site [including blood, cerebrospinal fluid (CSF), pleural fluid, peritoneal fluid, pericardial fluid, bone, joint/synovial fluid, or internal body sites (e.g., lymph nodes, brain)] OR detection of pathogen-specific nucleic acid in a specimen obtained from a normally-sterile body site using a validated molecular test.

Confirmed, early-onset disease
A confirmed case that occurs in any child under 7 days of age.

Confirmed, late-onset disease
A confirmed case that occurs in any child 7-89 days of age.

Table 1: Criteria that must be met for a case to be classified

Criterion	Confirmed
Laboratory evidence	
Isolation of *S. agalactiae* from a normally-sterile body site	S
Detection of *S. agalactiae*-specific nucleic acid in a specimen obtained from a normally-sterile body site using a validated molecular test	S

Notes:
S = This criterion alone is SUFFICIENT to report a case.
Early-onset disease = all confirmed cases under 7 days old.
Late-onset disease = all confirmed cases 7-89 days old.

Outbreaks

Two or more epidemiologically linked cases (in unrelated people) from a NICU, school, long-term care, or similar facility in a 30-day period would constitute an outbreak and warrant further investigation in Utah.

Identification of case contacts

None.

Case contact management

None.

References

1. Centers for Disease Control and Prevention. (2022, October 18). *Group B strep: Fast facts and statistics.* https://www.cdc.gov/groupbstrep/about/fast-facts.html

2. Barshak, M. B., Madoff, L. C. (2017). Group B streptococcal infections in nonpregnant adults. *UpToDate*. Retrieved March 1, 2017, from https://www.uptodate.com/contents/group-b-streptococcal-infections-in-nonpregnant-adults

3. Centers for Disease Control and Prevention. (2023, March 16). *Streptococcus laboratory: Streptococcus agalactiae*. https://www.cdc.gov/streplab/groupb-strep/index.html

4. Centers for Disease Control and Prevention. (2022). *Bact facts.* Retrieved February 24, 2023, from https://app.powerbigov.us/view?r=eyJrIjoiNjc5OGRjODctNWQ5ZC00ZWEwLWI5ZjgtNGI3ZmFhODVmYTlhIiwidCI6IjljZTcwODY5LTYwZGItNDRmZC1hYmU4LWQyNzY3MDc3ZmM4ZiJ9&pageName=ReportSectione93482d78e7dc3ed111b

5. American Society for Microbiology. (2021, July 23). *Guidelines for the detection and identification of group B Streptococcus*. https://asm.org:443/Guideline/Guidelines-for-the-Detection-and-Identification-of

6. American College of Obstetricians and Gynecologists (ACOG) Committee. (2020). Prevention of group B streptococcal early-onset disease in newborns: ACOG committee opinion summary, number 797. *Obstetrics & Gynecology*, *135*(2), 489–492. https://doi.org/10.1097/AOG.0000000000003669

7. Utah Department of Health and Human Services (2012-2022). [National Electronic Disease Surveillance (NEDSS) data on GBS morbidity and mortality] [Unpublished raw data]. Utah NEDSS database. Retrieved March 20, 2023.

8. Public Health Agency of Canada. (2012, April 30). *Pathogen safety data sheets: Infectious substances – Streptococcus agalactiae*. https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/streptococcus-agalactiae.html

9. Centers for Disease Control and Prevention. (2022, November 9). *People at increased risk for group B strep.* https://www.cdc.gov/groupbstrep/about/increased-risk.html

10. Centers for Disease Control and Prevention. (2022, October 18). *Clinical information about group B strep.* https://www.cdc.gov/groupbstrep/clinicians/index.html

11. Steere, A. C., Aber, R. C., Warford, L. R., Murphy, K. E., Feeley, J. C., Hayes, P. S., Wilkinson, H. W., & Facklam, R. R. (1975). Possible nosocomial transmission of group B streptococci in a newborn nursery. The Journal of pediatrics, 87(5), 784–787. https://doi.org/10.1016/s0022-3476(75)80311-8

12. Centers for Disease Control and Prevention. (2022, December 7). *Group B strep: Causes and how it spreads.* https://www.cdc.gov/groupbstrep/about/causes-transmission.html

13. Puopolo, K. M., Lynfield, R., Cummings, J. J., Committee on Fetus and Newborn, Committee on Infectious Diseases, Hand, I., Adams-Chapman, I., Poindexter, B., Stewart, D. L., Aucott, S. W., Goldsmith, J. P., Mowitz, M., Watterberg, K., Maldonado, Y. A., Zaoutis, T. E., Banerjee, R., Barnett, E. D., Campbell, J. D., Gerber, J. S., … Zangwill, K. (2019). Management of infants at risk for group B streptococcal disease. *Pediatrics*, *144*(2), e20191881. https://doi.org/10.1542/peds.2019-1881

14. United States Census Bureau. (n.d.). *U. S. Census Bureau quickfacts: Utah*. Retrieved July 13, 2023, from https://www.census.gov/quickfacts/fact/table/UT/RHI225222

15. Siegel, J., Rhinehart, E., Jackson, M., Chiarello, L., & Healthcare Infection Control Practices Advisory Committee. (2023). *Transmission of infectious agents in healthcare settings*. Centers for Disease Control and Prevention. https://www.cdc.gov/infectioncontrol/pdf/guidelines/Isolation-guidelines-H.pdf (Original work published 2007)

16. Centers for Disease Control and Prevention. (2022, September 28). *ABCs case definition ascertainment.* https://www.cdc.gov/abcs/methodology/case-def-ascertain.html

Additional resources

American College of Obstetricians and Gynecologists (ACOG). (2019, July 1). *Group B strep and pregnancy*. https://www.acog.org/en/womens-health/faqs/group-b-strep-and-pregnancy

Berardi, A., Trevisani, V., Di Caprio, A., Bua, J., China, M., Perrone, B., Pagano, R., Lucaccioni, L., Fanaro, S., Iughetti, L., Lugli, L., & Creti, R. (2021). Understanding factors in group B streptococcus late-onset disease. *Infection and Drug Resistance*, *14*, 3207–3218. https://doi.org/10.2147/IDR.S291511

Centers for Disease Control and Prevention (2022, October 18). *Group B Strep*. https://www.cdc.gov/groupbstrep/index.html

Lyhs, U., Kulkas, L., Katholm, J., Waller, K. P., Saha, K., Tomusk, R. J., & Zadoks, R. N. (2016). Streptococcus agalactiae serotype IV in humans and cattle, northern Europe. *Emerging Infectious Diseases Journal*, *22*(12). https://doi.org/10.3201/eid2212.151447

Delannoy, C. M., Crumlish, M., Fontaine, M. C., Pollock, J., Foster, G., Dagleish, M. P., Turnbull, J. F., & Zadoks, R. N. (2013). Human Streptococcus agalactiae strains in aquatic mammals and fish. *BMC Microbiology*, *13*(1), 41. https://doi.org/10.1186/1471-2180-13-41

Version control

Updated 11/29/2023: All sections were updated with extensive edits to add more inclusive language (“pregnant people” instead of “pregnant women”), to update the epidemiology of GBS reservoirs, transmission, morbidity, and mortality, add Utah-specific epidemiologic surveillance for 2012-2022, define “normally-sterile site,” update the surveillance case definition to be in line with ABC states surveillance and add validated molecular tests, such as PCR, as a confirmatory test when the specimen is from a normally-sterile site. Added “Critical clinician information” section. Swim lanes were added to aid in case classification. Added UT-NEDSS/Epitrax minimum/required fields by tab. Added a copy of the case investigation form.

UT-NEDSS/EpiTrax minimum/required fields by tab

Morbidity event

Demographic

- First name
- Last name
- City
- State
- County
- Date of birth
- Area code
- Phone number
- Birth sex
- Ethnicity
- Race

Clinical

- Disease
- Onset date
- Date diagnosed
- Died
- Date of death
- Clinical syndromes

Laboratory

- Performing lab
- Collection date/time
- Specimen source
- Organism
- Test result
- Lab test date/time

Epidemiological

- Imported from

Administrative

- LHD case status
- State case status (completed by UDHHS)
- Outbreak associated
- Outbreak name

Case report form

Demographic information			
Last name:		First name:	MI:
Address:		City:	State:
County:	ZIP:	Date of birth: _____/_____/_____	Age:
Phone #1:		Phone #2:	Phone #3:
Birth sex: ☐ M ☐ F ☐ U		Race: (Check all that apply) ☐ White ☐ Black/African American ☐ American Indian ☐ Unknown ☐ Asian ☐ Alaskan Native ☐ Native Hawaiian or Pacific Islander	
Ethnicity: ☐ Hispanic ☐ Not Hispanic ☐ Unknown			
What type of insurance does patient have?			
Parent/guardian name:			Relationship:
Patient's occupation:			

Clinical information	
Onset date: _____/_____/____ Date diagnosed: _____/_____/____ Clinician name:	
Was patient hospitalized? ☐ Y ☐ N ☐ U	Hospital: Date of admission: _____/_____/____ to _____/_____/____ Medical record #: Was the patient in an ICU or CCU? ☐ Y ☐ N ☐ U Was the patient intubated? ☐ Y ☐ N ☐ U Discharge location: ☐ Home ☐ Left AMA ☐ LTC/SNF ☐ Long-term acute care ☐ Unknown ☐ Other_____
Did patient die? ☐ Y ☐ N ☐ U	Date of death: _____/_____/____ GBS-caused death? ☐ Y ☐ N ☐ U
Was the patient pregnant at time of onset? ☐ Y ☐ N ☐ U	

Syndromes, underlying causes, and sequelae

Clinical syndromes (select all that apply):

☐ None ☐ Unknown ☐ Abortion with sepsis ☐ Abscess (not skin) ☐ Bacteremia ☐ Cellulitis
☐ Chorioamnionitis ☐ Empyema ☐ Endocarditis ☐ Endometritis ☐ Epiglottitis
☐ Hemolytic uremic syndrome ☐ Meningitis ☐ Necrotizing fasciitis ☐ Osteomyelitis ☐ Otitis media
☐ Pericarditis ☐ Peritonitis ☐ Pneumonia ☐ Puerperal septicemia ☐ Septic (infective) arthritis
☐ Septic shock ☐ Septicemia, bacterial ☐ Staphylococcal toxic shock syndrome

☐ Other (specify):_____

Did the patient have any underlying causes or prior illnesses? ☐ Y ☐ N ☐ U

If yes, check all that apply:

☐ AIDS ☐ Alcohol abuse ☐ Asthma ☐ Blood cancer ☐ Bone marrow transplant ☐ Broken skin
☐ Cancer ☐ Cancer treatment ☐ Cerebrospinal fluid leak ☐ Cerebrovascular accident
☐ Chronic respiratory disease ☐ Chronic hepatitis C ☐ Cirrhosis/liver failure ☐ Cochlear prosthesis
☐ Complement deficiency disease ☐ Congestive heart failure ☐ Connective tissue disorder
☐ Coronary arteriosclerosis ☐ Corticosteroids ☐ Current chronic dialysis ☐ Deaf/profound hearing loss
☐ Dementia ☐ Diabetes mellitus ☐ Drug user, IV ☐ Drug user, other ☐ Emphysema/COPD
☐ Hodgkin's disease (clinical) ☐ HIV infection ☐ Immunoglobulin deficiency
☐ Immunosuppressive therapy ☐ Kidney disease ☐ Leukemia ☐ Multiple myeloma ☐ Multiple sclerosis ☐ Myocardial infarction ☐ Nephrotic syndrome ☐ Neuromuscular disorder ☐ Obesity ☐ Paralysis
☐ Parkinson's disease ☐ Peptic ulcer ☐ Peripheral neuropathy ☐ Peripheral vascular disease
☐ Premature birth ☐ Renal failure/dialysis ☐ Seizure disorder ☐ Sickle cell trait ☐ Smoker, current
☐ Smoker, former ☐ Solid organ malignancy ☐ Solid organ transplant ☐ Missing spleen (asplenia)
☐ Splenectomy/asplenia ☐ Systemic lupus erythematosus

Current smoking status:

☐ E-cigarette user ☐ Marijuana user ☐ Not a smoker ☐ Tobacco user ☐ Unknown

Current alcohol abuse? ☐ Y ☐ N ☐ U

Does patient have documented drug user disorder (DUD) or abuse? ☐ Y ☐ N ☐ U

If yes, what is patient's mode of substance delivery?_____

List any other substances currently abused:_____

Childbirth-related disease

At the time of first positive culture, was the patient pregnant or postpartum?

The postpartum period is defined as the 30 days following a delivery or miscarriage

☐ Not pregnant or postpartum ☐ Patient currently pregnant ☐ Postpartum ☐ Unknown

If pregnant or postpartum:

What was the outcome of the fetus? (Select one)

☐ Live birth—neonatal death ☐ Induced abortion ☐ Survived, clinical infection*
☐ Survived, no apparent illness ☐ Still pregnant ☐ Abortion/stillbirth ☐ Unknown

*If yes to "Survived, clinical infection," create a CMR for the baby as well

Is the patient <2 years of age? ☐ Y ☐ N ☐ U

If yes, answer the following questions. If no or unknown, go to the next section.

If patient <1 month of age, indicate birth weight _____ Units: ☐ g ☐ kg ☐ oz ☐ lb

If premature birth was an underlying condition for an infant <2 year of age, specify gestational age at birth in completed weeks: _____ weeks

Early/late onset GBS disease

The information in this section will come from records of the infant's illness:

Was the patient less than 90 days old at time of onset? ☐ Y ☐ N ☐ U

If yes to above question, please fill out all questions under "Early/late onset GBS disease"

Answer the following questions from the infant's medical record+

Specify infant's birth place:
☐ Hospital (name/location of hospital):_____ ☐ En route to hospital ☐ Birthing center
☐ Home birth ☐ Other, specify_____ ☐ Unknown
Infant's birth weight: _____ Birth units: ☐ g ☐ kg ☐ oz ☐ lb
Date/time of newborn discharge from hospital of birth: ____/____/____ ____:____

Did the infant receive antibiotics during the first illness episode? ☐ Y ☐ N ☐ U

If yes, name of antibiotic(s) used:
☐ amoxicillin ☐ amoxicillin/potassium clavulanate ☐ ampicillin ☐ ampicillin/sulbactam ☐ azithromycin
☐ cefazolin ☐ cefotaxime ☐ cefoxitin ☐ ceftazidime ☐ ceftriaxone ☐ cefuroxime ☐ cefuroxime axetil
☐ cefuroxime sodium ☐ cephalothin ☐ ciprofloxacin ☐ clarithromycin ☐ clindamycin ☐ doxycycline
☐ erythromycin ☐ gentamicin ☐ levofloxacin ☐ penicillin ☐ trimethoprim/sulfamethoxazole
☐ tetracycline ☐ vancomycin

Route of antibiotic administration:
☐ Intramuscular (IM) ☐ Intravenous (IV) ☐ Oral (PO)

Did infant receive breast milk from mother (for late onset GBS cases only): ☐ Y ☐ N ☐ U

If yes, was breast milk received before onset of GBS infection? ☐ Y ☐ N ☐ U

How was the baby delivered? (choose one)
☐ vacuum ☐ forceps ☐primary c-section ☐ repeat c-section
☐ vaginal after previous c-section ☐ vaginal ☐unknown

Was the baby admitted to the NICU? ☐ Y ☐ N ☐ U
Gestational age (in weeks): _____

The information in this section will come from the mother's medical records:

Maternal admission to hospital for delivery: _____/_____/_____ _____:_____ ☐ am ☐ pm
Date and time of membrane rupture: _____/_____/_____ _____:_____ ☐ am ☐ pm

What type of rupture? ☐ artificial ☐ spontaneous

Date and time of delivery: _____/_____/_____ _____:_____ ☐ am ☐ pm

Was duration of membrane rupture ≥ 18 hours? ☐ Y ☐ N ☐ U

If membranes ruptured <37 weeks, did membranes rupture before onset of labor? ☐ Y ☐ N ☐ U

Did Labor and Delivery know about the mother's screening test and results? ☐ Y ☐ N ☐ U

Did the mother have a recorded fever >38 °C (100.4 °F) during delivery? ☐ Y ☐ N ☐ U

If yes, indicate the date/time of fever onset of the mother: _____/_____/_____ _____:_____ ☐ am ☐ pm

Mother's age at delivery: _____ Number of prior pregnancies:_____

Mother's blood type: ☐ A ☐ AB ☐ B ☐ O

Did the mother have prior history of penicillin allergy? ☐ Y ☐ N ☐ U

Maternal history of anaphylaxis ☐ Y ☐ N ☐ U

Did the mother have any underlying causes or prior illnesses? ☐ Y ☐ N ☐ U

☐ Other, specify_____ ☐ AIDS ☐ Alcohol abuse ☐ Asthma ☐ Blood cancer
☐ Bone marrow transplant ☐ Broken skin ☐ Cancer ☐ Cancer treatment ☐ CSF leak
☐ Cerebrovascular accident ☐ Chronic respiratory disease ☐ Chronic hepatitis C
☐ Cirrhosis/liver failure ☐ Cochlear prosthesis ☐ Complement deficiency disease
☐ Congestive heart failure ☐ Connective tissue disorder ☐ Coronary arteriosclerosis
☐ Current chronic dialysis ☐ Deaf/profound hearing loss ☐ Dementia ☐Diabetes mellitus
☐ Drug user, intravenous ☐ Drug user, other ☐ Emphysema/COPD ☐ Hodgkin's disease (clinical)
☐ HIV infection ☐ Immunoglobulin deficiency ☐ Immunosuppressive therapy ☐ Kidney disease
☐ Leukemia ☐ Multiple myeloma ☐ Multiple sclerosis ☐ Myocardial infarction ☐ Nephrotic syndrome
☐ Neuromuscular disorder ☐ Obesity ☐ Paralysis ☐ Parkinson's disease ☐ Peptic ulcer
☐ Peripheral neuropathy ☐ Peripheral vascular disease ☐ Premature birth ☐ Renal failure/dialysis
☐ Seizure disorder ☐ Sickle cell trait ☐ Smoker, current ☐ Smoker, former ☐ Solid organ malignancy
☐ Solid organ transplant ☐ Missing spleen (asplenia) ☐ Splenectomy/asplenia
☐ Systemic lupus erythematosus

Did the mother receive intrapartum antibiotics? ☐ Y ☐ N ☐ U

If yes, what was the reason for administration of intrapartum antibiotics?

☐ C-section prophylaxis ☐ GBS prophylaxis ☐ Mitral valve prolapse
☐ Suspected amnionitis or chorioamnionitis ☐ Prolonged latency ☐ Unknown
☐ Other, specify _____

Name of antibiotic used:

☐ Amoxicillin ☐ Amoxicillin/potassium clavulanate ☐ Ampicillin ☐ Ampicillin and sulbactam
☐ Azithromycin ☐ Cefazolin ☐ Cefotaxime ☐ Cefoxitin ☐ Ceftazidime ☐ Ceftriaxone
☐ Cefuroxime ☐ Cefuroxime axetil ☐ Cefuroxime sodium ☐ Cephalothin ☐ Ciprofloxacin
☐ Clarithromycin ☐ Doxycycline ☐ Erythromycin ☐ Gentamicin ☐ Levofloxacin

☐ Penicillin ☐ Trimethoprim/sulfamethoxazole ☐ Tetracycline ☐ Vancomycin

☐ Other, specify: _____

Route of antibiotic administration: ☐ Intramuscular (IM) ☐ Intravenous (IV) ☐ Oral (PO)

Number of doses of antibiotic given before delivery: _____

Stop date of antibiotic: _____/_____/_____

Date of mother's last menstrual period before delivery? _____/_____/_____

Was maternal GBS colonization screened for BEFORE admission (in prenatal care) or AFTER admission (before delivery)?

☐ AFTER admission (before delivery) ☐ BEFORE admission (in prenatal care)

If BEFORE admission:

Did screening occur at 36 through 37 weeks of gestation? ☐ Y ☐ N ☐ U

Which laboratory performed the screening test?_____

What was the screening result? ☐ Positive ☐ Negative ☐ Inconclusive ☐ Unknown

If AFTER admission:

Date and time specimen was collected: _____/_____/____ _____:_____ ☐ am ☐ pm

What was the screening result? ☐ Positive ☐ Negative ☐ Inconclusive ☐ Unknown

Did the mother have bacteriuria caused by GBS at any time during pregnancy? ☐ Y ☐ N ☐ U

If yes, what order of magnitude was the colony count?

☐ 0 ☐ <10,000 ☐ 10k – <25,000 ☐ 25k – <50,000 ☐ 50k – <75,000 ☐ 75k – <100,000 ☐ ≥ 100,000 ☐ U

Has this mother previously delivered an infant with GBS disease? ☐ Y ☐ N ☐ U

Did the mother have a previous pregnancy with GBS colonization? ☐ Y ☐ N ☐ U

Did the mother receive any prenatal care prior to delivery? ☐ Y ☐ N ☐ U

If yes, list number of prenatal care visits: _____

Date of first and last prenatal visits: First visit _____/_____/____ Last visit _____/_____/____

Estimated gestational age at last documented prenatal care visit in weeks: _____

Laboratory information

Was culture done? ☐ Y ☐ N ☐ U

Name of laboratory: _____ Date collected: _____/_____/____

Sample collected: ☐ Blood ☐ CSF ☐ Tissue/muscle/bone ☐ Fluid ☐ Placenta ☐ Other

Test results: (Check one)

☐ Positive—Confirmed ☐ Inconclusive ☐ Negative ☐ Pending

Was PCR done? ☐ Y ☐ N ☐ U

Name of laboratory: _____ Date collected: _____/_____/____

Sample collected: ☐ Blood ☐ CSF ☐ Tissue/muscle/bone ☐ Fluid ☐ Placenta ☐ Other

Test results: (Check one)

☐ Positive—Confirmed ☐ Inconclusive ☐ Negative ☐ Pending

Reporting

Reported by: (Check all that apply)

☐ Hospital/ICP ☐ Clinic/doctor's office ☐ Lab ☐ General public ☐ Other _____

What is the date the lab reported to the clinician? _____/_____/_____

Reporter's name: _____ Phone number: _____

Reporter's agency: _____ Date reported to public health: _____/_____/_____

LHD investigator:	Phone:	Date submitted to DHHS: _____/_____/_____

LHD reviewer:

LHD case classification: (Check one)

☐ Confirmed ☐ Probable ☐ Suspect ☐ Pending ☐ Out of state ☐ Not a case

DHHS case classification:

☐ Confirmed ☐ Probable ☐ Suspect ☐ Pending ☐ Out of state ☐ Not a case